FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list :—

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Jan. 23 .... **Lieut. N. A. Olechnovitch, Member: "A Few Experiments with Shock-Absorbing Hulls for Flying Boats," before I.Ae.E.**

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EDITORIAL COMMENT.

AIRCRAFT manufacturers and designers form a large proportion of the claimants for awards dealt with in the third report of the Royal Commission on Awards to Inventors, which was issued this week as a White Paper, and extracts from appendices to which are published elsewhere in this issue of FLIGHT. There is little need for going into details regarding the various machines and engines mentioned in the list of awards, as these will, in practically every case, be well known to readers of this journal. Paragraph 10 of the Report states that: "Claims in respect of the design of aircraft and of engines for aircraft are distinguished by the fact that the inventions or suggestions or designs in respect of which awards have been claimed are concerned with instruments of warfare, which were comparatively in their infancy at the commencement of the late War. The variations therein, important as, in practice, they have proved to be, have in many cases appeared to be almost trivial, and it has been difficult to determine a criterion of value. We have endeavoured in determining the amount of our awards to maintain a uniform standard of payment for these inventions, having regard on the one hand to their inventive merit and the services rendered to Your Majesty's Government or its contractors, and on the other hand to the advantages which, in many instances, the inventors obtained by receiving the advice and assistance of the staff of the Departments by whom their inventions were utilised."

Awards to Inventors

The last sentence is not without its humorous side to those "in the know," but even accepting it seriously, the amounts awarded seem, generally speaking, to verge on the very moderate side, considering the part British aviation played in the War, and we do not think that any fair-minded person can possibly accuse the Royal Commission of having squandered the taxpayers' money.

By far the largest individual awards, as regards aircraft and engines, are those to the Aircraft Manufacturing Co., Ltd., who receive, in conjunction with Mr. G. Holt Thomas and the Gnome and Rhone Co.,

£74,000 in respect of the 80 h.p. Gnome and the le Rhone engines (in addition to £200,000 already received from H.M. Government), £75,000 in respect of the Gnome *Monosoupape* engine, and the Aircraft Manufacturing Company £65,000 in respect of the use by the United States of De Havilland machines during the War and up to July 25, 1919, and the Aircraft Manufacturing Company and Capt. de Havilland £35,000 in respect of D.H. aeroplanes used by Great Britain.

The next largest individual award, one of £50,000, goes to the Bristol Aeroplane Company in respect of the Bristol Fighter, of which large numbers were built and used during the War, and which was one of the most popular of all British aeroplanes.

The Sopwith Aviation and Engineering Company come next, with an award of £40,000 in respect of the Sopwith "Cuckoo," "Dolphin," "Snipe," and "Salamander" aeroplanes, and in view of the formidable series of machines of unquestioned usefulness produced by that famous firm during the War, few will quarrel with the award.

In connection with the use by the United States of America of British aeroplane and engine designs, etc., it may be recollected that it was agreed that if the American Government placed with American manufacturers orders for the production of British aeroplanes, engines and accessories, the British Government would itself bear any liability in respect of the rights of the British manufacturers during the War. In considering the question the Joint Commission, consisting of three members of the Royal Commission and three representatives nominated by the United States Government, decided to classify the subject under three heads: The period during the War, the period between the end of the War and the date on which manufacturing in America ceased, and the future. It is worthy of note that the report states that there was no case in which the Joint Commission failed to come to a unanimous decision.

Brief details of the machines, etc., which came under consideration in this connection are given in Appendix II to the Report. We have already referred to the award to the Aircraft Manufacturing Company. Handley Page, Ltd., are awarded £9,000 in respect of War-time use of the 0/400 machines, and the Bristol Aeroplane Company £2,500 in respect of the war use of the Bristol Fighter. The only aircraft firm to be awarded anything under the head "future user" is A. V. Roe and Co., Ltd., who are awarded £1,000. Mrs. Mynnie Porte, widow of the late Commander J. C. Porte, is awarded £1,500 in respect of post-War use (*i.e.*, from July 25, 1919, to date of award) of flying boats.

Taking it all round, the awards seem distinctly on the low side, especially the latter, possibly out of consideration for the terrible financial position in which the War left the U.S., and the appendices contain the names of claimants whom one would certainly have expected to have received awards, but whose claims have not been allowed. Doubtless, however, the very fullest particulars have been given to, and carefully considered by, the Royal Commission.

* * *

The Rotor in a Wing

Elsewhere in this issue of FLIGHT we describe briefly certain experiments carried out at the Rijks-Studiendienst voor de Luchtvaart at Amsterdam, by Dr. Wolff, director of that institute, on a rotating cylinder mounted in the leading edge of an aerofoil. The experiments cannot, of course, be regarded as conclusive proof of the suitability, granting the mechanical possibility of mounting and operating such rotors, of the rotating cylinder as a means of obtaining better efficiency from aerofoils. The experiments do show, however, that a very considerable increase in maximum lift coefficient is obtainable in this manner, but the question of drag still has to be settled. The percentage increase in maximum lift coefficient amounts, in the aerofoil tested, to no less than 73·3 per cent. Although not equal to the increase of lift obtainable with the Handley Page slotted wing, it is by no means to be despised, and it should be remembered that whereas the Handley Page wing has now undergone fairly extensive development, the rotor wing has but recently been made the subject of study. There is as yet no possibility of telling how much lift can be obtained. The rotor by itself has been shown by the American experiments described in FLIGHT last week to be capable of giving lift coefficients far in excess of anything obtained with an aeroplane wing, but the L/D ratio is not very good, except at very low forward speeds. It may well be that for faster machines, the ordinary aerofoil wing, fitted with one or more rotors, may offer a better solution. From the curves published this week, obtained in the Amsterdam laboratory, it will be seen that there is a striking resemblance in effect between the wing fitted with a rotor in its leading edge and the Handley Page slotted wing. Both increase the maximum lift coefficient, and both increase the angle at which the maximum lift coefficient occurs. In one way, the Handley Page slotted wing may justly be claimed to score over the rotor wing, unless the latter be found capable of developing much greater lifts than the slotted wing, in that no mechanical transmission or gear is required to give the necessary circulation of air, this function being performed, in the Handley Page wing, by the slots themselves.

The fact that the Dutch experiments have shown that fitting the rotor has the effect of increasing the lift and the angle of maximum lift, while the American tests show the lift to be proportional to rotor speed, obviously suggests the use of rotors for maintaining lateral control at large angles of incidence. Certain experiments in this country, by the Royal Aircraft Establishment at Farnborough, and by private aircraft firms, have proved that it is possible to design an aeroplane which remains perfectly controllable at angles much greater than the stalling angle, but only by the use of wing flaps having an area of approximately one-third of the total wing area, and correspondingly large tail surfaces. It would seem that there is at any rate very good reason to believe that the rotor may offer a solution of this difficult problem. If it does nothing else, it will have amply justified itself, for probably 90 per cent. of accidents are due to loss of control at low speeds. That certain not inconsiderable mechanical difficulties will arise is to be expected, but they should not prove altogether insuperable.

The whole subject is one of such fascinating possibilities that it is to be hoped our own authorities will lose no time in putting a series of experiments in hand at the N.P.L., or at Farnborough, in order that this country may not be left behind other nations in probing the problems of the rotating cylinder in all its applications to aviation.

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AIRCRAFT ENGINEER AND AIRSHIPS

THE FOCKE-WULF TYPE A.16

An Interesting German Commercial Aeroplane

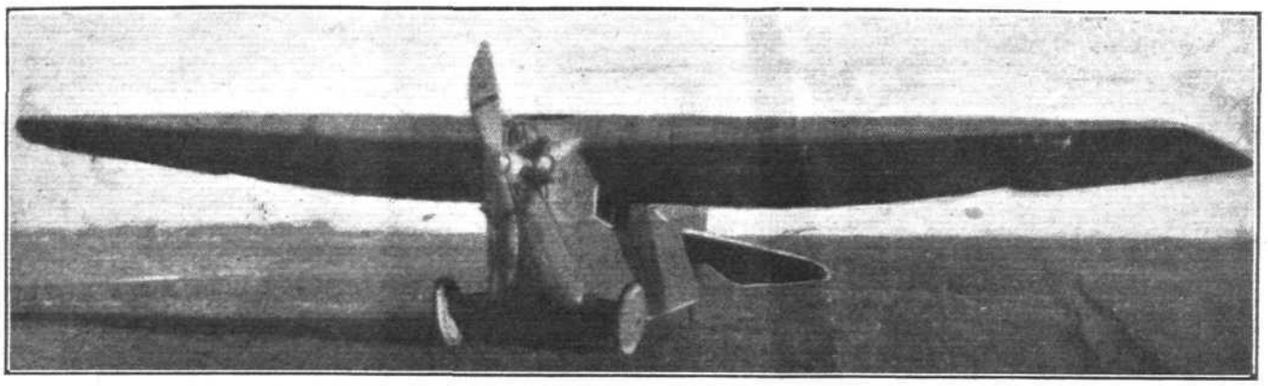
THE question has frequently been argued whether or not it is possible to apply the principles governing light aeroplane design to larger machines—in other words, whether it is possible to build an enlarged version of a light 'plane and get the same relative efficiency as regards performance and useful load. It is generally maintained that this is not possible because the structure weight of an aeroplane increases as the cube of the dimensions while the area increases only as the square. To this argument—which is, of course, perfectly sound from a theoretical point of view—the answer is sometimes advanced that the rate at which the percentage of useful or paying load decreases with size can, in practice, be diminished by changes in structural design, *i.e.*, by not making the larger machine geometrically similar to the smaller in all its structural details. Sometimes it is found that in a large machine it is possible to use built-up components in place of solid ones, and thus effect a saving in weight. If this is done wherever possible the result is that the structure weight does not increase quite as the cube, although probably more rapidly than the square of the dimensions.

In view of the arguments, sometimes rather heated, that have centred around this subject, we have thought it of interest to give an illustrated description of a German commercial aeroplane recently produced, in which, to a very large extent, the features which characterise many modern light 'planes have been incorporated, and which, in spite of its low engine power, carries four persons at a very good speed. This machine is the Focke-Wulf A. 16, fitted with a 75 h.p. Siemens radial air-cooled engine. The A. 16 carries three passengers in addition to the pilot, so that the power expenditure is but 25 h.p. per paying passenger. In spite of this fact, the top speed is 135 km./h. (84·4 m.p.h.), so that there can be little doubt as to the efficiency of the design. The A. 16 was designed and built by the Focke-Wulf Flugzeugbau, A.G., of 21/22 Loeningstrasse, Bremen, a firm of recent date, having been established in January of 1924.

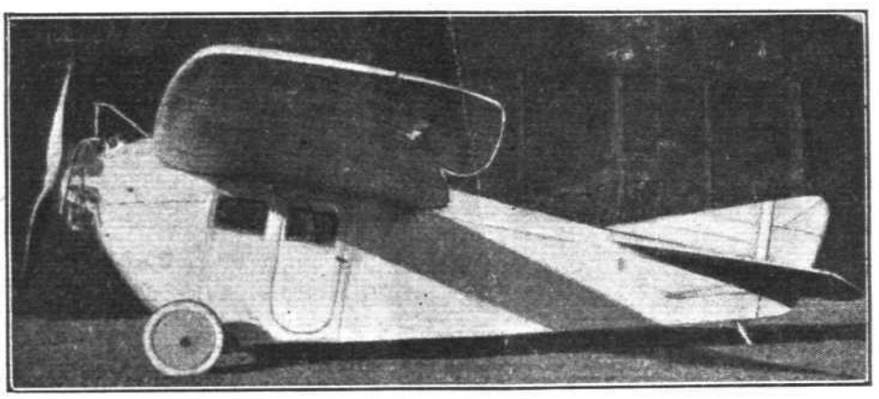
As the accompanying photographs and general arrangement drawings will show, the Focke-Wulf A. 16 is a cantilever high-wing monoplane in which every care has been taken to suppress all external bracing, not only of the wing structure, but of the tail members and undercarriage. The lines, although clean, are not particularly smooth, especially in the neighbourhood of the nose, where sudden changes of direction occur. This is, of course, due to the necessity of providing reasonable cabin space on the one hand and reducing the cross-sectional area immediately aft of the engine on the other. The steep slope of the "breast" does not, however, appear to have affected the efficiency to any great extent, for which possibly the fact that this portion is covered with a fairly rounded aluminium cowling is responsible. In other words, if one were to draw "waterlines" through the fuselage these would show a fairly rounded form in front.

On top of the fuselage there is a central hump which conforms to the upper curvature of the wing section, and so there is no sudden discontinuity in the region of maximum air pressure, if one excepts the coaming around the pilot's cockpit, which is placed immediately ahead of the front wing spar. The wing is placed wholly on top of the fuselage structure, and the centre portion forms, in fact, part of the cabin, giving more than 6 ft. of head room.

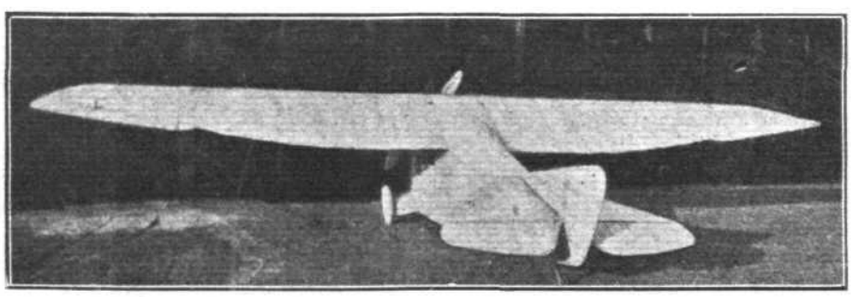
The wing section used appears to be one of the Schoukowsky family (it is erroneously shown with flat bottom camber in the side elevation of the general arrangement drawings), and the wing tapers both in chord and thickness from root to tip.



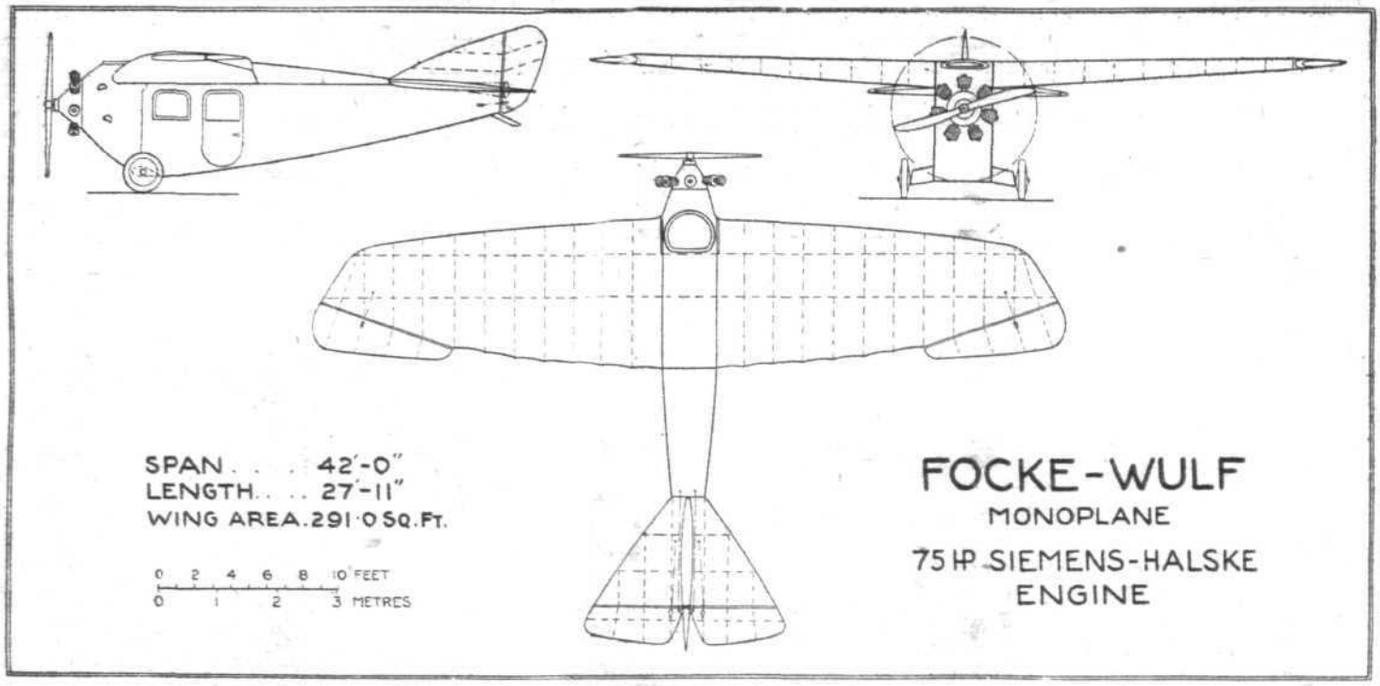
THE FOCKE-WULF A.16 : Three-quarter front view. The engine is a 75 h.p. Siemens radial air-cooled.



THE FOCKE-WULF A.16 : Side view, showing entrance door to cabin.



THE FOCKE-WULF A.16 : Three-quarter rear view.



THE FOCKE-WULF A.16 : General arrangement drawings, to scale.

In order to simplify construction the spars run parallel throughout the span, more or less forming a rectangular section box. Wood is the material employed, not only in the wing, but throughout the machine with a very few exceptions. The wing is covered with fabric, while the fuselage is of the flat-sided *monocoque* type with three-ply covering. The bottom of the fuselage is flat, but the top has a deck fairing extending aft to the tail plane.

Over the central portion of the fuselage, where the cabin is situated, the walls are of double-planked three-ply, with the structural members enclosed between the two plankings, thus leaving the cabin walls perfectly smooth. The interior is finished in mahogany, and the three seats for the passengers are comfortably upholstered. Access to the cabin is through a door on the port side, and owing to the design of the machine the passengers can step into the cabin direct from the ground without the use of steps, the height of the door-step above the ground being only about a foot. Two windows in each side give an unobstructed view in most directions, as the wing is placed above the fuselage.

As already mentioned, the pilot's cockpit is placed ahead of the wing, and owing to his proximity to the engine, combined with the downward slope of the cowling, his view is particularly good. In fact, it would be almost impossible to think of any way of improving the view. The small radial engine obstructs it to a very small extent only, and the narrow width of the fuselage just aft of the engine enables the pilot easily to look over either side. The one objection to this placing of the pilot, *i.e.*, the possible risk of injury in case the machine turns over, seems to be met by the presence, immediately behind the pilot's head, of the very substantial and deep front wing spar.

The 75 h.p. Siemens-Halske radial air-cooled engine is mounted on a steel engine plate attached to stout ash frames forming the forward extension of the longerons. A fireproof bulkhead is interposed between the engine and the cockpit and cabin, and as the petrol tank, with a capacity for four hours at full throttle, is placed out in the starboard wing, the fire risk should be very small. It is claimed that this tank position not only enables direct gravity feed to be used, but that the weight of tank and fuel serves to counteract the engine torque as well.

The undercarriage is of the wing-stump, cantilever type, and is built, in the Focke-Wulf A. 16, in the form of a box inside which the divided axle rests. The outside of the box is streamlined with three-ply. The whole undercarriage is built up as a unit and can be detached from the machine by undoing six bolts. A somewhat similar arrangement is employed in the case of the wing and tail, both of which can be removed as complete units by undoing a few bolts.

Controls are of the usual type, but a refinement has been introduced by the employment everywhere of ball bearings. This, it may be recollected, is now a feature of all de Havilland machines, where the use of ball bearings has been found to result in a marked increase in the lightness of the controls. In the Focke-Wulf A.16 only a small portion of the control cables is exposed, the greater portion being taken inside the fuselage. In order to facilitate inspection of control cables, etc., the deck faring of the fuselage is easily detachable, and when it is removed, the cables and fuselage structure can be readily examined.

During the official test flights at Adlershof (which corresponds roughly to our Martlesham or Farnborough) the Focke-Wulf A. 16 attained a top speed of 135 km./h. (84·4 m.p.h.), while the rate of climb was 0·92 metre per second (181 ft./min.) at a height of 3,000 ft. This is not, of course, a very spectacular performance, but in view of the relatively heavy loading is about all that could be expected. These figures, by the way, relate to the machine fully loaded, with pilot, three passengers and fuel for four hours. It is stated that the stalling speed is about 60 km./h. (37½ m.p.h.). The machine takes off in about 160 yards and pulls up in about 55 yards, once the wheels have touched. It has, however, the same characteristics as light 'planes in landing, *i.e.* it " floats " along a considerable distance before settling down.

Following are the main data of the Focke-Wulf A. 16, the overall dimensions being given on the G.A. drawings : Wing area, 291 sq. ft. Weight empty, 570 kg. (1,254 lbs.) ; useful load (pilot, three passengers and four hours' fuel), 400 kg. (880 lbs.). Total loaded weight, 970 kg. (2,134 lbs.). Power loading, 28·5 lbs./h.p. ; wing loading, 7·33 lbs./sq. ft.). Duration 4 hours. Range approximately 550 km. (350 miles). It is of interest to note that the ratio of useful load to gross weight is 41¼ per cent. Looked at in another way, for a useful range of, say, 300 miles at 80 m.p.h., the paying load (*i.e.*, 3 passengers) is 6·7 lbs./h.p.

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A Singapore Air Base

IN connection with the naval base at Singapore, the question of establishing a large air station there also is, we understand, under consideration.

Air Liner Defies the Fog

DURING the dense fog which covered London last Sunday a feat unprecedented in the history of civil aviation was accomplished by G. P. Olley of Imperial Airways. Olley left Paris at noon in one of the Handley Page W.8's with a full load of passengers and freight, and after flying through a mixture of fog and sunshine eventually arrived over Croydon at schedule time (2.30 p.m.). The aerodrome, however, was completely enveloped in dense fog—visibility on the ground being about 5 yards ! Guided by rockets, the tops of the wireless masts, and control tower, etc., the pilot succeeded in bringing the machine safely to earth, making a perfect landing on the 'drome. The ground staff, it appears, had some difficulty in locating the machine after it had landed !

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THE AVIA B.H.17 BIPLANE SAND TESTED

IT may be recollected that at the Aero Show at Prague last summer the Czechoslovak firm of Milos Bondy a spol exhibited, among other machines, a single-seater fighter, the B.H.17, fitted with 300 h.p. Hispano-Suiza engine. The letters B.H., incidentally, are the initials of the two Milos Bondy designers, Messrs. Benes and Hainz, who have been responsible for the long series of successful machines produced by this very energetic Prague aircraft firm. We now learn that one of the B.H. 17 machines has been subjected to sand-loading tests, which it passed with flying colours.

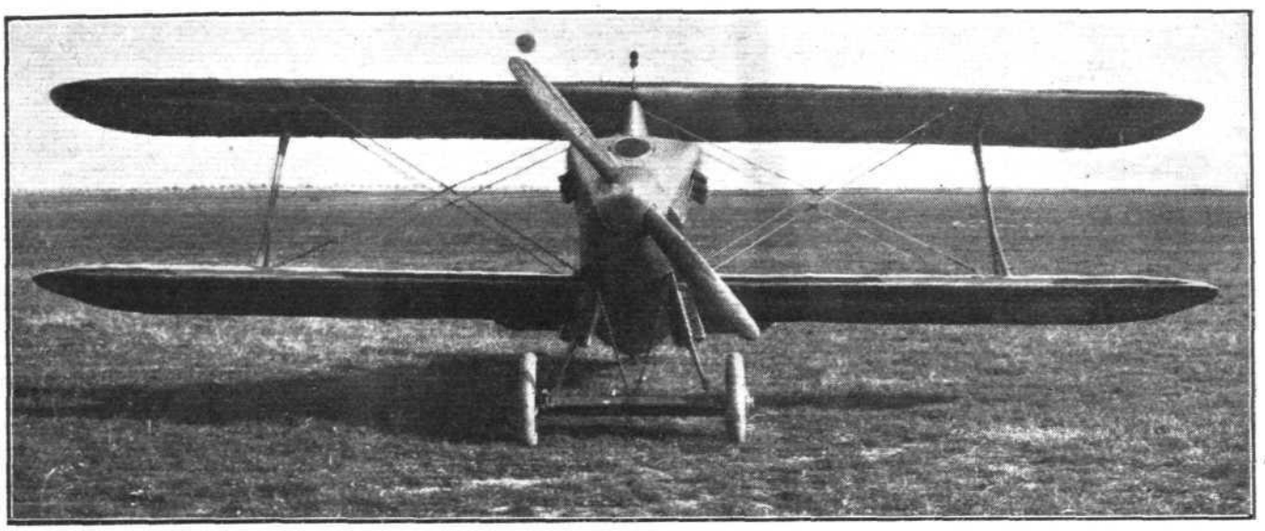
The tests were carried out at the beginning of December last under official supervision, and were also witnessed by several French officers. The machine had to comply with the Czech factors of safety of 10 for the wings and 8 for other parts.

One of our photographs shows the wings of the Avia B.H.17 under sand test, on which they withstood a load 12·5 times greater than the normal, and partial break did not occur until after a period of three minutes. The wings had previously been asymmetrically loaded, *i.e.* the wings on one side were loaded with ten and those on the other with nine load units, a test which they withstood satisfactorily.

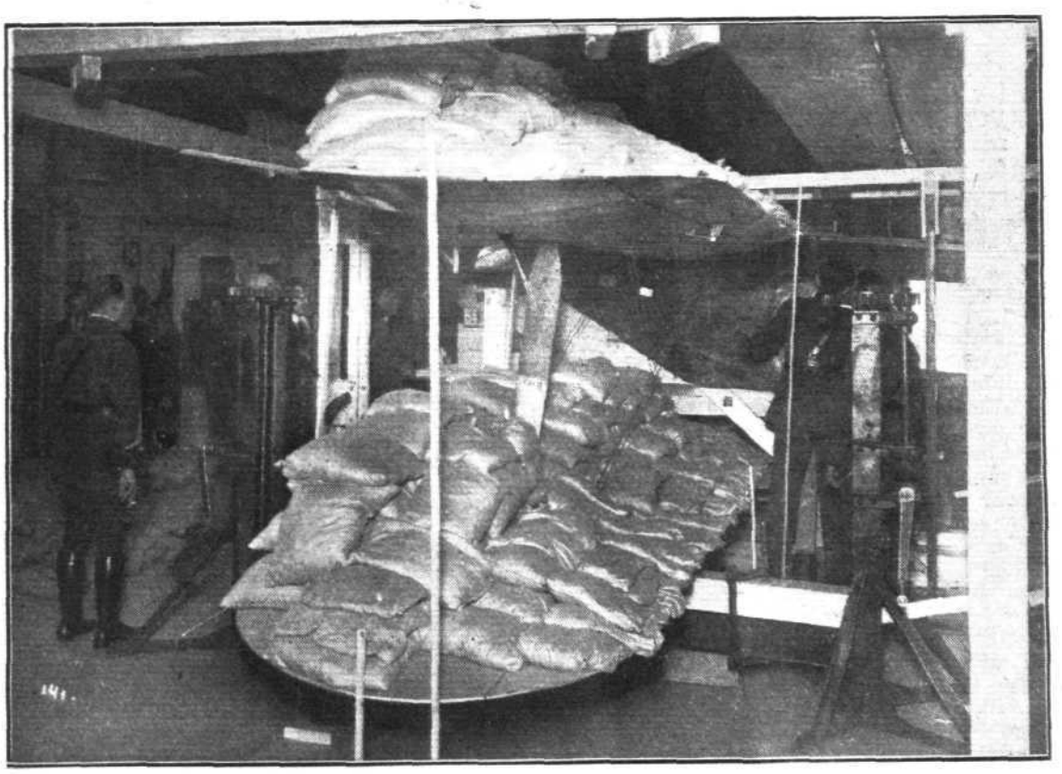
The fuselage proved to be 80 per cent. stronger in torsion and 125 per cent. stronger in bending than the prescribed factor. It finally broke under bending load. The fuselage tests were carried out by sand loading the tail, asymmetrically for the torsion test and symmetrically for the bending test.

The undercarriage was subjected both to steady loads and to drops from various heights, and came through the tests without breaking. The results are stated to have been regarded as highly satisfactory, both by the Czech officials and by the French representatives.

In our description of the Avia B.H.17 last summer we expressed some doubt as to the soundness of the peculiar turnbuckle bracing of the single I-struts, but we are informed that during the recent tests this fitting did not yield to the slightest extent during the whole of the sand loading tests, so that there can now be no doubt of the adequacy of this form of strut-bracing.



Front view of the Avia B.H.17, fitted with 300 h.p. Hispano-Suiza engine.

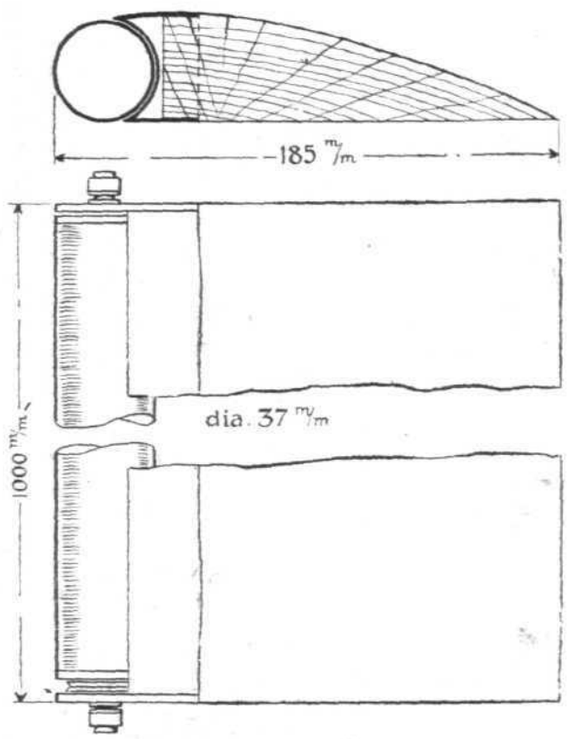


The Avia B.H.17 undergoing sand-loading tests. A factor of safety of 12·5 was reached, and then the wings did not break until the load had been sustained for three minutes.

PRELIMINARY STUDY OF THE INFLUENCE OF A ROTATING CYLINDER ON A WING

UNDER above heading a most interesting article, by Dr. Ir. E. B. Wolff, appears in the Dutch engineering journal *De Ingenieur* of December 6, 1924. Dr. Wolff is Director of the Rijks-Studiendienst voor de Luchtvaart at Amsterdam, and has been kind enough, upon seeing the interest FLIGHT is taking in the subject of the application of the rotor principle to aerodynamics, to call our attention to the article and inform us of further tests that are to be made at Amsterdam.

The experiments described were, Dr. Wolff states, undertaken mainly as a result of certain works by Joukowsky, Bjerkness and Ackeret, which gave Dr. Wolff the idea, after the Delft Conference on Applied Mechanics in April, to make certain tests at the Rijks-Studiendienst, which corresponds to



DUTCH EXPERIMENTS WITH ROTORS : Arrangement and dimensions of the rotor and aerofoil.

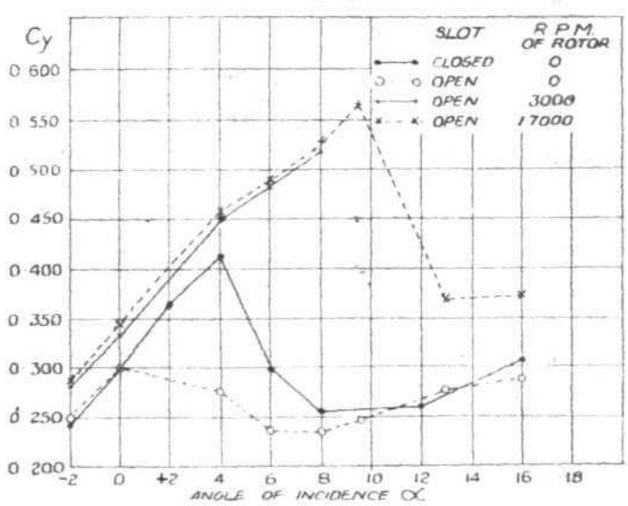
our National Physical Laboratory. As the main problem to be solved was whether or not it would be possible to obtain increased lift from an aeroplane wing by building into its leading edge a rotating cylinder, no attempt was made, during the preliminary experiments, to obtain drag or centre of pressure measurements, the lift only being measured. Incidentally, it should be mentioned that when Dr. Wolff undertook the tests he had no knowledge of Herr Flettner's work in Germany, so that it appears that Germany, Holland and the United States have almost simultaneously attacked the problem of the rotor. (An account of the American experiments was published in FLIGHT last week.)

The wing section used in the Dutch experiments does not appear to have been a particularly efficient one, but was employed because templates were already in existence, and one section appeared as good as another for the purpose of finding out whether there was a possibility of obtaining increased lift. The overall dimensions of the wing are given in the accompanying diagram, which also shows the method of mounting the rotating cylinder on a spindle. The aspect ratio of the wing itself was low (5·4), so that the low value of the maximum lift coefficient is scarcely astonishing. It is of interest to note that the ratio of cylinder diameter to wing chord is fairly high, *i.e.* 20 per cent. It seems likely that future tests may show this ratio to be of considerable importance, and for the sake of efficiency it is to be hoped that a smaller ratio will be found to give as good results. The aspect ratio of the cylinder itself was approximately 27, or roughly twice that of the cylinder tested in America, which had a diameter of 4½ ins. and a length of approximately 5 ft.

The model was suspended in the wind tunnel "upside down," and, as already stated, measurements were made of lift only. The rotor was driven by an electromotor of ⅛ h.p. and was geared up in the ratio 7 to 1. The experiments included readings taken at various air speeds and rotor speeds, at angles of incidence ranging from $-2°$ to $+16°$. As it was thought that the opening between cylinder and wing section might cause a certain leakage of air, the gap was closed with paraffin wax on the upper surface and the contour smoothed down. This proved to effect a considerable increase in lift over that obtained with the slot open, as will be seen from the accompanying graph, which shows the results at a wind speed of 16·7 m. per second (54·8 ft./sec.). In the article in *De Ingenieur* the results of the tests are tabulated, but as the graph shows with sufficient accuracy the figures obtained we have not thought it necessary to publish the table.

It will be seen that with the cylinder stationary and the slot open the maximum lift coefficient occurs at an angle of incidence of 0° and has a value of 0·3 (absolute) only. With the upper end of the slot closed this figure is increased to 0·413, and the upper critical angle is increased from 0° to 4°. The other two curves show the lift coefficient at a channel air speed of 16·7 m./s., and with the cylinder revolving at 3,000 r.p.m. and 17,000 r.p.m., respectively. The rotational speed of 3,000 r.p.m. corresponds to a peripheral speed of 5·9 m./s. (19·35 ft./sec.), and that of 17,000 r.p.m. to 33·5 m./s. (110 ft./sec.), at which the ratios of peripheral to translational speed are 0·353 and 2 respectively. It may be recollected that in the American tests with the plain rotor it was found that the best L/D was obtained when $\frac{V^1}{V} = 2·5$ approximately, but that the value of the lift coefficient seemed to increase with increase in this ratio, up to the highest measured, where the ratio was 4·32 and the lift coefficient 9·48, or 4·74 in "absolute" units.

Whereas the American tests on a plain rotor showed the lift coefficient to be very nearly proportional to the value of r



DUTCH EXPERIMENTS WITH ROTORS : Results of wind-tunnel tests. With slot closed and rotor stationary the maximum lift coefficient is 0·42. With the rotor running at 17,000 r.p.m. this value is increased to 0·564, and it is interesting to note that very nearly as good results are obtained with the rotor running at only 3,000 r.p.m. (0·52).

(ratio of peripheral to translational speed), the Dutch experiments with a wing section provided with a rotor in its leading edge seem to indicate that this ratio is not critical. Thus with the cylinder rotating at 3,000 r.p.m., the lift coefficient is 0·522, which is only increased to 0·527 when the rotor speed is 17,000 r.p.m. Compared with the section with rotor stationary and upper end of slot or gap closed, the increase in lift is considerable. Below the critical angle of what may be termed the normal wing section this increase is in the neighbourhood of 10 per cent., but when the critical angle has been passed the increase is much greater. Thus the maximum lift coefficient of the "normal" section is 0·413, while with the rotor running at 3,000 r.p.m. the value is increased to 0·522. The upper critical angle is raised from 4° to 8°. When the rotor speed is increased to 17,000 r.p.m., the maximum lift coefficient becomes 0·564 at an angle of 9·6°, an increase in lift of 73·3 per cent.

It is interesting to note that the general shapes of the curves are very similar to those obtained with the Handley Page

slotted wing, but the percentage increase in lift is not so great. So far we have no knowledge of the effect of the presence of the rotor on the L/D of a wing section. It appears likely that the shape of the nose which the rotor will necessitate may adversely affect the drag. The American tests on a compound strut indicated that, at a channel air speed of 10 m./s., the drag coefficient was considerably greater at high than at low peripheral speeds. On the other hand, when the air speed was 20 m./s. the drag coefficient of the compound strut remained sensibly constant from 500 r.p.m. to 2,000 r.p.m., with, if anything, a slight decrease in drag with increase in rotational speed. The American tests, however, were carried out with the compound strut placed at 0 angle of incidence, and are, therefore, scarcely a criterion of what the effect would be if the angle were altered.

A vast amount of research work remains to be done on rotating cylinders in their application to aerodynamics, but already it can be said that the preliminary tests have given good promise. One application to practical aeroplanes which suggests itself is that of the use of the rotors for lateral control at or above the stalling angle. The Dutch experiments have shown that the effect of the rotor is to raise the critical angle as well as the maximum lift coefficient, and it should thus be possible to fit two rotors, operated by a differential and provided with brakes so that as one rotor is slowed down the other is speeded up. Unfortunately, the Dutch tests indicate that a very considerable change in speed will be necessary before any considerable righting moment is applied. On the other hand, the American plain rotor was very sensitive to changes in r, so that it almost appears that some compromise between the plain rotor and the rotor built into the leading edge will have to be made. At any rate, the best size and disposition of the rotor has not yet been determined, but the subject of control at large angles is one of paramount importance, and no avenue should be left unexplored which gives hope of a solution of the problem.

MALLOCK-ARMSTRONG EAR DEFENDER

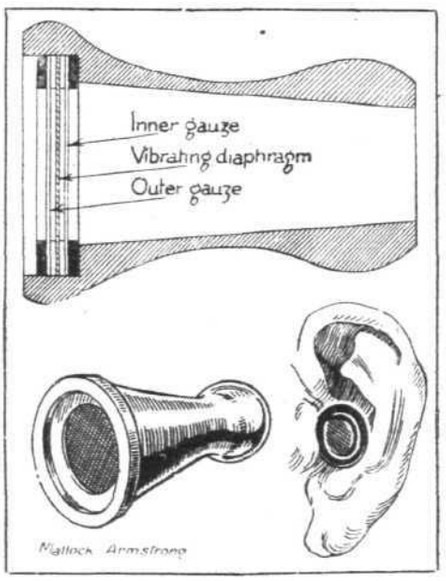
WE give below some brief particulars of a simple but effective device that is employed in the British Naval, Military and Air Services (as well as in the U.S. Army and Navy) as a protection for the ears against "gun-deafness" and other ill effects likely to be caused by any abnormal noise or explosion. This device was originally intended for use by gunners, but it has proved equally successful when employed in a variety of other fields, such as engine testing, for pilots (or passengers) of aircraft, deep-sea diving, etc.

The principal advantage of the "Ear-Defender," which is supplied by the Mallock-Armstrong Ear Defender Co., of 86, Petty France, London, S.W.1, is that while it protects the ears from the effects of loud explosions it preserves small sounds generated at a distance, which can be heard as under normal conditions. Thus, conversation and commands, telephone and voice-pipe messages can be heard as usual whilst wearing the Ear Defenders.

As may be gathered from the accompanying sketch, the principle of the Mallock-Armstrong Ear Defender is extremely simple. It consists of a pair of small ebonite plugs which are made to fit into the ear. In the outer end of each plug is a diaphragm, on either side of which, but spaced a certain distance from it, is a protective disc of gold wire gauze. Normal sounds cause the diaphragm to vibrate freely and so transmit the sound waves to the ear drum. Any violent vibrations of the diaphragm, caused by loud explosions, etc., are checked or damped by the gauze protectors, and the ear drum is not, therefore, unduly affected.

The "Defenders" are made in a variety of sizes, to accommodate all dimensions of ear-orifice, and the presence of the "Defenders" in the ear is soon forgotten and is by no means uncomfortable.

The advantages of these "Ear Defenders" in connection with aircraft will at once be apparent to readers of FLIGHT, and when once employed the extraordinary benefit obtained will, we feel certain, be appreciated very considerably. In conclusion, we may add that the Mallock-Armstrong Ear Defenders are made up in very neat outfits, consisting of a dark green metal pocket-case, distinctively marked outside, containing one pair of Defenders secured in the case by strong rubber holders.



The Mallock-Armstrong "Ear Defender," which, inserted in the ear orifice as shown, protects the ear against the effect of loud explosions, etc., at the same time allowing normal sounds to be heard as usual. Details of the ear protector are shown in the top sketch.

The Airship Base in Egypt

CAIRO has been referred to as the "Clapham Junction" of future air routes. Whether that idea has been dropped or not, we are not in a position to know, but at any rate it now appears fairly certain that the mooring mast to be erected in Egypt will be situated at Ismailia and not, as at first expected, at Cairo. The decision to place at Ismailia the mooring mast for airships operating on the London-Egypt-India-Australia air route is a little difficult to understand. Ismailia, although possibly the cleanest town in Egypt, is not a great centre like Cairo, but possibly it has been chosen from political and strategic considerations rather than on account of its immediate suitability. Ismailia is situated on the banks of the Suez Canal, a little more than half-way down from Port Said to Suez, on the Bitter Lakes, and is in railway communication with these towns. Presumably the location would be convenient in the event of the airship service working in co-operation with steamship lines running through the Canal, although to the lay mind it would appear that Port Said might have been a more suitable location. However, doubtless there are very good reasons for choosing Ismailia, even if they do not appear on the surface.

Autres Temps, Autres Moeurs

IN striking contrast to the attitude of the late Lord Northcliffe, who not only personally and spontaneously wrote to the Editor of FLIGHT in appreciation of the work done by the paper, but who went farther and expressed the wish that so far as possible quotations should be given from FLIGHT and the source acknowledged, was the publication in the *Daily Mail* of January 12, in an article dealing with "Rotor-plane Tests," of the statement that "laboratory researches which—as stated exclusively in Saturday's *Daily Mail*—indicate that rotors . . ." Whatever the ultimate value, if any, of the rotor in its application to aeronautics, it would seem to be at least but courteous to "render unto Cæsar, etc." As far as this country is concerned, FLIGHT, on November 27, 1924, published the first article on the possibilities of applying the rotor principle to aeroplanes, and followed this up, on December 4, with another article suggesting a method of testing the rotor on a light 'plane. The "exclusive" announcement, which was accompanied by an illustration which is more than in first-cousin relationship to FLIGHT's original sketch, to which the *Daily Mail* refers as having appeared in their issue of Saturday last (January 10), commences as follows: "It became known last night . . ." Curiously, the issue of FLIGHT of January 8 contained the results of tests made in America, which were sent to us by the Director of Aeronautical Research in the United States, as a direct result of our previous articles on the rotor. We are content to let our readers draw their own conclusions, and would merely state that to us it seems that a newspaper in the unexampled position of the *Daily Mail* should be able, without loss of dignity, to afford to be generous in giving "place of origin" credit to other workers in the interests of progress who may be on a less exalted *commercial* pinnacle.

NON-REGULAR AIR SQUADRONS

The Special Reserve and Auxiliary Air Forces

IN the sum total, British arms—or we should rather write English arms—owe most of their lustre to the citizen force which, under the various titles of Fyrd, Militia and Special Reserve, has existed from before the times of Hengist and Horsa up to the present day. But in the last three reigns the provision of a really efficient fighting force to back up our exiguous regular army has been a problem which has baffled many War Ministers. Had Lord Haldane met with better success in his attempt to solve that problem, the Great War might not have lasted from 1914 to 1918.

Undismayed by the difficulties of the War Office in the past, the Air Ministry has set itself the task of raising a citizen air force on such a considerable scale that to it is to be committed about 25 per cent. of the air defence of Great Britain. Before his tenure of the command-in-chief of air defences has expired Air Marshal Sir John Salmond will, it is hoped, have at his beck and call 52 squadrons of fighters and bombers. Of these, one-quarter—namely, 13 squadrons—are to be provided by non-regular forces, seven by the Special Reserve Air Force and six by the Auxiliary Air Force. These 13 units will all be bombers, for, it is very rightly held, fighter squadrons require such constant practice—drill, we may call it—and must be prepared to move at such very short notice, that only regulars can undertake the work. The 13 non-regular squadrons, when raised, will be under the command of Air Commodore John G. Hearson, C.B., C.B.E., D.S.O., who at present has his office with the H.Q. Coastal Area in Tavistock Street.

If some of our readers are getting confused by the various classes of outside help which the Air Ministry is busily establishing, it is excusable. There is (1) the Reserve of Air Force officers, who upon mobilisation would be absorbed into the regular squadrons; (2) the Special Reserve Air Force; and (3) the Auxiliary Air Force. The two latter are, as stated above, to provide complete units, and will not be used, as the first class will be, to make good war wastage in regular units.

It becomes important to distinguish with some care between the Special Reserve and the Auxiliary Air Force. At first sight the differences do not appear very marked, but it is easy to understand that when the two forces come into being the actual distinctions will be considerable, and they will tend to grow greater as time goes on. Speaking in general terms, the Special Reserve will be analogous to the Militia and the Auxiliary Air Force to the Territorial Army. The Air Ministry appears to have copied the War Office in establishing two non-regular forces. The reason why it has adopted this policy is rather elusive and baffling. Probably it was felt that two nets were better than one, and the result may justify that belief. But in so far as the plan is mere plagiarism, and it certainly bears an appearance of being partly so, it is open to the criticism of setting up needless complications and running the risk of confusing the popular mind. The War Office has the excuse of history for relying upon two citizen forces. The Militia, as we mentioned above, is our oldest fighting force, older by many centuries than the Regular Army. For various reasons, largely of a social nature, it failed to attract to its ranks many classes of the population which have been proved to possess fine fighting qualities; and therefore, in the reign of Queen Victoria the Volunteer movement was started, and out of the Volunteers grew the Territorial Army.

The Air Ministry is not hampered by history and tradition. It has a perfectly clean slate. Moreover, there is this great difference between the Air Force and the Army—that in the former the fighting man, the man who actually pulls the trigger, is almost invariably an officer; in the Army that man is a private. The social consideration therefore applies even more strongly to citizen air forces than to citizen armies. While we are not prepared to say that the Air Ministry is wrong in instituting two non-regular air forces (we must wait for results before condemning or applauding), it does seem to us that a single organisation would have offered as good a chance of achieving the desired object as two can offer.

The Special Reserve

The two non-regular forces are to differ in (1) methods of recruitment and maintenance; (2) establishment; and (3) location. The Special Reserve recruiting will follow the normal procedure for enlisting personnel for the regular Royal Air Force. That is to say, it will be organised directly by the Air Ministry. The establishment will consist of, approximately, one-third regular officers and men to two-thirds non-regulars. The strength of a day-bombing squadron (which will use single-engined aircraft) will be about 26 officers and 160 other ranks, while a night-bombing squadron (using twin-engined aeroplanes) will have about 30 officers and 240 men. Both forces will provide night-bombing as well as day-bombing squadrons, and there will in each case be a difference in the strength according to whether the unit is S.R. or A.A.F.

In general, the idea appears to be to locate Special Reserve squadrons in large towns, especially those containing engineering works, and to provide a headquarters aerodrome close to the town. The regular personnel will be sufficient to maintain the aerodrome, equipment, etc., and the non-regular elements will be able to receive instruction and drill in all duties (flying, rigging, fitting, etc.) on the aerodrome. The S.R. squadrons will be designated by numbers starting from 500.

The Auxiliary Air Force

The units of the Auxiliary Air Force will be raised and administered by existing Territorial Associations, which have been given by Parliament new powers to deal with them. In establishment, the regular element will be cut down to a minimum, approximately two officers and 20 other ranks, which will only suffice to carry out the day-to-day maintenance of the unit. It appears probable that the headquarters aerodromes will usually be located out in the country; and where this is the case, a drill hall will be provided in the nearest town. Ordinary ground instruction in theory of aeronautics, rigging, functioning, and care of engines, etc., will be carried out in the drill halls. The scheme rather wears the appearance of trying to catch the agriculturist rather than the mechanic, but it may not work out so in practice. The designating numbers of the A.A.F. units will start with 6,00 and, in addition, a Territorial designation will be added. The first to be raised will be known as No. 600 City of London (Bombing) Squadron.

Headquarter Aerodromes

The list of headquarter aerodromes for the 13 non-regular squadrons is being compiled. Three have been definitely decided upon, and the units to be stationed at them have been published. They are:—

London: Hendon Aerodrome. One S.R. squadron and two Auxiliary squadrons.

Edinburgh: Turnhouse Aerodrome. One Auxiliary squadron.

Glasgow: Renfrew Aerodrome. One Auxiliary squadron.

It is hoped that two or three of these five squadrons will be formed this spring, and others in the near future.

War Stations

The feature of the scheme which commands the most unstinted admiration is the allocation to each non-regular squadron of a war station. These stations will be on service aerodromes within the defence system. Provision will be made on the aerodrome for the accommodation of the non-regular squadron, and on the outbreak of war each of them will proceed at once to its war station. This is good, but it is only straightforward common sense. What is better, and does credit to the imagination of the Air Ministry, is the provision that during peace time the non-regular squadrons shall from time to time proceed to their war stations and undergo combined training with the R.A.F. units permanently stationed there and with the ground defence batteries. Nothing helps the citizen soldier (and the same will apply to the citizen airman) so much as close association with the regulars. But in the old days of the Volunteers, the regular soldiers were too apt to treat the amateurs with scorn, to laugh at their shortcomings rather than to admire their spirit, and the last thing they would have thought of doing was to offer active help and encouragement. In the Air Force of the future we may hope to see arise an *esprit de l'aerodrome*, which will make the regulars feel pride or shame according as their own particular non-regular squadron performs well or ill. An indifferent performance, especially if it is contrasted with a more creditable one by a non-regular squadron from another aerodrome, should prompt the regulars to give active assistance in putting things to rights. What one hopes to hear in the future is, say, a regular pilot officer from Biggin Hill chaffing one from Hawkinge on the lines of "Did you see our auxiliary squadron yesterday? Jolly good formation, eh? Your S.R. crowd weren't anything like as good." Such a spirit would give the best assurance of efficiency in the non-regulars. And if the efficiency in both these forces is not on a high level, then 25 per cent. of our air defence strength must be discounted.

FLIGHT

AWARDS FOR WAR INVENTIONS

IN the third report of the Royal Commission on Awards to Inventors just issued, aircraft and various items appertaining thereto figure fairly prominently, and we give below a list of these, the total amount awarded in each case being shown in brackets :—

Messrs. G. Constantinesco and W. Haddon, synchronising gears, C.C. interrupter gears (£70,000).

Messrs. W. and T. Avery, Ltd., Parnell " Panther " ship aeroplane (£6,500).

Bristol Aeroplane Co., Ltd., " Bristol Fighter " aeroplane (£50,000).

Mr. C. R. Fairey and the Fairey Aviation Co., Ltd., " Hamble Baby " seaplane (£4,000).

Prof. J. G. Gray, stabilising gear (£2,900).

Société Anonyme des Filatures Corderies et Tissages D'Angers, " Bessonneau " hangers (nil).

Curtiss Aeroplane and Motor Corp., New York, U.S.A., aircraft and hydro-aircraft (nil).

Colonel J. C. Porte (Executive), improvements in flying boats nil).

Norman Thompson Flight Co., Ltd., N.T.2, N.T.2A, N.T.2B, N.T.3, and N.T.4 flying boats (£2,250).

Mr. W. D. Oddy, aircraft propellers (£500).

Mr. H. C. Cleaver, aircraft propellers (£1,200).

Sopwith Aviation Co., Ltd., " Cuckoo," " Dolphin," " Snipe," and " Salamander " aeroplanes (£40,000).

Mr. G. Brewer, rip panels for kite balloons (nil).

Mr. J. G. Latta, design of certain parts of B.H.P. aero engines (nil).

Air Navigation and Engineering Co., Ltd., and Société Anonyme pour L'Aviation et Ses Derives, S.P.A.D. aeroplanes (£600).

Aircraft Manufacturing Co., Ltd., La Société des Moteurs Gnome et Le Rhone, and Mr. George Holt Thomas, Gnome 80 h.p. and Le Rhone engines (£74,000, in addition to £200,000 already received from H.M. Government), Gnome monosoupape engine (£75,000).

Messrs. A. V. Roe and Co., Ltd., " Avro " aeroplane (£40,000).

Flying Officers D. E. Shaw and J. J. Brownridge, dual control of aeroplanes (£1,500).

Aircraft Manufacturing Co., Ltd., and Captain De Havilland, D.H. aeroplanes (£35,000).

Mr. W. A. Burns and Inventions and Research, Ltd., anti-aircraft sights and high-angle sights (£2,300 further award).

The following are from claims preferred against the U.S.A. for the use of various aircraft inventions :—

Aircraft Manufacturing Co., Ltd., D.H. aeroplane (total sum payable, £65,000).

Messrs. Aldis Brothers, Aldis unit sight (£3,500).

Bristol Aeroplane Co., Ltd., Bristol fighter aeroplane (£2,500).

Messrs. Handley Page, Ltd., and F. Handley Page, " O " type biplane (£9,000).

Messrs. H. Hughes and Son, Ltd., aircraft compasses (£2,250).

Mr. J. Imber, self-sealing petrol tank (nil).

Major F. C. V. Laws, aircraft cameras (£2,500).

Lieut-Col. J. T. C. Moore-Brabazon, aerial cameras (£400).

Messrs. Petters, Ltd., D.H. aeroplane with Liberty engine (nil).

Messrs. A. V. Roe and Co., Ltd., Avro aeroplane (£1,000).

Major F. W. Scarff, Scarff ring mounting (£1,000).

Sopwith Aviation and Engineering Co., Ltd., aeroplanes (nil).

Major H. E. Wimperis, course setting bomb sight, drift bomb sight (£2,100).

Lieut.-Col. Ogilvie and Aeronautical Instrument Co., Ltd., speed indicators (£140).

Mr. H. C. Cleaver, air propellers (nil).

Messrs. G. Constantinesco and W. Haddon, cynchronising gears (£15,000).

Mrs. Mynnie Porte, flying boats (£1,500).

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ROYAL AIR FORCE MEMORIAL FUND

THE last Executive Committee Meeting of the year was held at Iddesleigh House on December 17, 1924. In the absence of the Chairman, Lord Hugh Cecil, on duty at another meeting, the chair was occupied by the Hon. Treasurer, Sir Charles McLeod.

The usual list of donations and subscriptions was presented to the meeting, and the amount of grants which were sanctioned since the former meeting on October 15, 1924, *viz.* £986 14*s.* 11*d.*, was approved.

The Secretary reported to the Committee that since the last meeting of the Executive Committee on October 15, the sub-committee dealing with grants had investigated 56 cases, and that he, in the same interval, had dealt with 53 cases of a similar nature.

The committee were informed of the fact that in accordance with an agreement with the Air Ministry a certain sum of money had been placed by the fund at the disposal of the Air Ministry for use by air officers commanding R.A.F. commands abroad, to be used for the immediate relief of the families of officers and airmen who die whilst serving abroad.

Two further applications for benefits arising out of the educational grants sanctioned under the Salting Benefaction scheme, and which had been considered by the Grants Sub-Committee, were placed before the Executive Committee, and in both cases the grants recommended were duly approved.

The committee accepted with much pleasure a very kind offer made to them by the Officer Commanding the Electrical and Wireless School, R.A.F., Flower Down, Winchester, under which a large number of valuable reproductions of paintings by Flight-Lieut. Verpilleux, dealing with wireless telegraphy subjects during the Great War, were offered, together with a small sum, being the credit balance of the Picture Fund. It is hoped later to very fully advertise these reproductions, and to effect sales both amongst the Royal Air Force and the General Public, the proceeds coming to the Fund for its general purposes.

Next meeting of the committee, February 18, 1925, at 3 p.m.

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Faireys for Holland

WE are gratified to learn that the Fairey Aviation Co., Ltd., of Hayes, Middlesex, have received an important seaplane contract from the Dutch Government. These machines—which will be fitted with the 450 h.p. Napier " Lion " engine—are required for use in Dutch East India, and have been ordered from the Fairey Aviation Company after exhaustive tests of many other types in the tropics by the Dutch Naval Air Service. This contract, it may be added, was obtained in competition with the aircraft constructors from all parts of the world.

Air Action in Iraq

DURING the first week of this month several raids were made by Ihkwan (Wahabi) followers of Sultan Ibn Saud of Nejd on various tribes inhabiting the districts of Iraq about 70 miles from Samawa. The first raid was made upon the Beni Huchaim, near the Wahabi frontier, and it happened that at the time a British special service officer was visiting the tribe. The officer at once dashed to the nearest railway station, 60 miles away, and telegraphed the news to Air Headquarters at Baghdad. Owing to bad weather conditions, aircraft were unable to proceed to the scene until two days later, when, however, they located the raiders on the Iraq side of the frontier, and attacked them, with the result that the raiders fled, abandoning their loot, which was recovered by the tribesmen. In the second raid large numbers of the Iraqi were slaughtered—it is stated that every male over ten years of age was killed—and much property destroyed or stolen. A strong force of aeroplanes was at once dispatched in pursuit of the raiders, and when the latter were located they were attacked with bombs and machine guns. The raiders lost 50 killed and many camels, etc. It is proposed to establish a frontier post south of Nasiriyeh, garrisoned by Iraqi infantry and equipped with wireless, so as to report to Baghdad news of similar raids.

Japanese Flight to England

A BIG flight from Japan to England, *via* Siberia, is being organised by our Japanese contemporary *Asahi*, which has guaranteed £30,000 towards the total cost of the flight. A start will probably be made on May 1, and it is expected that London will be reached by May 16. Two Japanese-built Breguet biplanes, with 400 h.p. Lorraine-Dietrich engines, will be employed, one pilot being from the Japanese air service, and the other being provided by the *Asahi*. In addition to the mechanics, a newspaper reporter will take part in the flight.

THE AVRO TRAINING MACHINE

BEFORE dealing with the actual design of the Avro training machine, the author referred to some earlier Avro designs.

Up to 1910, Mr. Roe pioneered the tractor triplane, but in 1911 the company produced a small tractor biplane fitted with a 35 h.p. Green engine. This machine was actually built to end a controversy as to the relative merits of the tractor triplane and the tractor biplane.

A tractor biplane was constructed with a similar fusefage to that used for the triplane, and with main planes of the same total area. The performance of the biplane was better than the triplane, and the future development was entirely concerned with the tractor biplanes. A slide of this machine showed the disregard for the elimination of head resistance; in spite of this fact, the machine had a better performance than the more orthodox box-kite type of biplane.

Several similar machines were constructed and equipped with various engines, and various different wing sections were also tried. So promising were the results obtained that several other constructors produced machines on similar lines; some of these later developed into types which became famous. We called this our type 500.

In 1912, an entirely new type of tractor biplane was designed and produced. From the slide shown of this machine it was shown that it had quite a modern appearance even today. Radical departures were made from orthodox practice. A number were constructed for the War Office and used successfully at the Central Flying Schools.

The Avro 504 type was a direct development from this design, and was produced to obviate the shortcomings of the type 500. The construction of this machine commenced in 1913. The principal differences between this and the earlier machine were the fitting of a larger engine, heavy staggering of the wings, improvement in streamline form of the fuselage, introduction of a new type of undercarriage, alteration in wing section and a small increase in wing span and chord.

The first machine of this type was tested at Brooklands in 1913, but was returned to the works very shortly afterwards, when an alteration to the engine mounting and the aileron control was made. It was returned to Brooklands in November, 1913, the machine's external appearance on this occasion being almost identical with the type's appearance today. In fact, although much alteration to detail has taken place, the machine has remained up to the present day absolutely true to type.

The first orders were received about the middle of 1914 from the Government, and a few machines had been delivered before war was declared. The machine was extensively used in France during the early stages of the War on a variety of duties, including reconnaissance, gun-spotting, photographic work and light bombing, and some very notable achievements are to its credit, including the Zeppelin raid on Friedrichshafen and the destruction of the first Zeppelin.

About the end of 1915, the machine was not considered good enough for overseas work, and its subsequent use was entirely for instructional work. Although great numbers were constructed, it was not exclusively used as a training machine. The method of training about this time consisted of a course on Maurice Farmans, followed by a course on either Avros or B.E.s. This was the state of affairs until 1917, when Col. Smith-Barry successfully demonstrated that it was possible to train on the Avro without the need of a step-up machine. In consequence, the machine was standardised and the demand then became enormous, and many difficulties had to be contended with.

The type which was recommended for standardisation was the type 504J, which was very similar to the original version of the machine, but fitted with a 100 h.p. Mono engine. It was discovered that there were insufficient 100 h.p. Mono engines available for the increased demand of Avros, and, consequently, the design had to be altered so that it would accommodate other makes of rotary engines. This necessitated a re-design of the engine mounting, and this constituted the now famous Avro type 504K.

A short description of the variations from the original displayed in types A, B, C, D, E, F, J and K was then given by the use of slides.

The author then proceeded to give some notes, illustrated by lantern slides, of the post-War use of the type, both as a training machine and a light commercial aeroplane. He next described the post-War development of the type. The post-War development had, he said, been mostly in connection with the engine unit. Slides were shown of the machine fitted with a considerable number of different engines, including close-up views of the various mountings. There had also been post-War development in regard to the undercarriage, and slides were also shown of oleo undercarriages which had also been developed for the machine.

* Abstract of Paper to be read by Mr. R. J. Parrott (Honours Member), before the Institution of Aeronautical Engineers, at the Engineers' Club, on January 9, 1925.

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LIGHT 'PLANE CLUB DOINGS

WE shall be pleased to have reports regularly from Club Secretaries, or those directly connected with new Light 'Plane Clubs, so that by keeping our readers informed on this matter the whole movement may be helped forward to the benefit of the clubs and the popularising of "that Air feeling."

We have received the following report on the progress being made:—

Lancashire Aero Club.—The Committee held a meeting at the Hotel Victoria, Manchester, on January 12, and appointed the following sub-committees:—*Flying.*—This Sub-committee is composed of four pilots; they will draw up all rules relating to the flying of the machines and training. *Headquarters.*—This is formed by four members of the Club whose business gives them special knowledge of land, buildings, etc. They will be responsible for all arrangements as to the headquarters in Manchester and the aerodrome. *Construction.*—This is composed of five members—one a pilot, two who have been for many years among the building of aircraft and who are with the firm of Messrs. A. V. Roe, Ltd., a designer, and one member who has built and flown several gliders. *Finance.*—Four members who are accountants or bankers, and who will direct all money matters connected with the Club. A *Development* and a *Library* Sub-committee have also been appointed.

According to the rules of the Lancashire Aero Club, each sub-committee has a chairman who is a member of the General Committee; the sub-committees will carefully consider matters concerned with their special subjects, and will advise on these to the General Committee. In this way it is hoped that members will be able to take a closer part in the work being done, and that much of the early work will be in the hands of experts, so that when a plan is laid before the Committee it will have been considered and modified by specialists.

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The Airship Service to India

SIR SEFTON BRANCKER, Director of Civil Aviation, who has flown to India in a D.H. 50, piloted by Alan Cobham, has during the last week or so been busy conferring with the powers that be in India in connection with the Airship Service to India. Sir Sefton has inspected a proposed site for an Airship base some 14 miles out from Bombay, while other plans have, we believe, also been considered. In a conversation with a representative of *The Times* Sir Sefton Brancker expressed his satisfaction in regard to his journey from England. After leaving Bukarest the only really difficult passage was over a distance of about 50 miles in Anatolia during the crossing of the Taurus mountains, followed immediately by the crossing of a short spur of the Lebanon range. Thenceforward to Karachi was plain sailing. Sir Sefton Brancker believed that they were the first to cross the Taurus mountains in winter, when the meteorological conditions certainly make that part tricky. The stretch of 450 miles along the Persian Gulf would be unpleasant if the machine had to descend, for the land communications are difficult in that area. He laid emphasis on the fact that the Air Ministry wanted the Indian Government to state its requirements in order that the Ministry could give advice as to how to meet those requirements in the most satisfactory manner. He was anxious to see the Calcutta-Rangoon route opened, for it obviously presented the best commercial proposition owing to the absence of railway communication. The Air Ministry had ordered the construction of experimental seaplanes suitable for such a route, and also for that from Karachi to Basra.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, January 6, 1925

General Duties Branch

Flyg. Offr. H. G. Kirkman (Capt., Ind. Army, retd.) is granted hon. rank of Flight Lieut.; Dec. 18, 1924. Flyg. Offr. H. K. Waterfield is transfd. to Reserve, Cl. C.; Dec. 31, 1924. Flyg. Offr. H. H. Sharp is placed on retired list on account of ill-health; Jan. 7. Flyg. Offr. J. G. Shackleton relinquishes his short serv. commn. on account of ill-health; Jan. 7.

Medical Branch

Flight Lieut. J. Speak (Capt., Dental Surg., Gen. List, Army) relinquishes his temp. commn. on resigning his commn. in the Army; Dec. 19, 1924.

Reserve of Air Force Officers

R. P. Whyte is granted a commn. in Cl. A., Gen. Duties Branch, as a Pilot Offr. on probation; Jan. 6. The follg. Flyg. Offrs. are confirmed in rank; Dec. 24, 1924:—E. F. Haselden, F. M. Kitto. The follg. Flyg. Offrs. are transfd. from Cl. A. to Cl. C.:—F. Neale; Jan. 4. E. E. Owen; Jan. 6.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Marshal.—Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., to H.Q. Air Defences of Great Britain, on appointment as Air Officer Commanding-in-Chief. 1.1.25.

Group Captain P. F. M. Fellowes, D.S.O., to Royal Airship Works, Cardington, for duty as Director of Airship Development. 1.12.24.

Wing Commander T. R. Cave-Browne-Cave, C.B.E., to Royal Airship Works, Cardington, for technical duties. 1.12.24.

Squadron Leader R. B. B. Colmore, O.B.E., to Royal Airship Works, Cardington, 1.12.24.

Flight Lieutenants:—R. S. Booth, A.F.C., F. M. Rope, H. C. Irwin, A.F.C., and S. Nixon, O.B.E., to Royal Airship Works, Cardington. 1.12.24. D. S. Don to No. 17 Sqdn., Hawkinge. 15.1.25. R. W. Chappell, M.C., to R.A.F. Depot. 15.1.25. C. W. Mackey and A. Latimer, to R.A.F. Depot on transfer to Home. Estab. 18.12.24. H. A. Smith, M.C., to R.A.F. Depot (Non-Effective Pool). 1.1.25.

Flying Officers:—F. J. Islip to R.A.F. Depot on transfer to Home Estab. 13.12.24. H. D. Wardle to No. 4 Flying Training Sch., Egypt. 9.12.24. H. A. Anson to H.Q., Iraq. 21.11.24. T. Rose, D.F.C., to No. 29 Sqdn., Duxford. 12.1.25. F. W. van Blommestein to R.A.F. Depot. 7.1.25. H. R. Vaughan Fowler to Aeroplane and Armament Experimental Estab., No. 22 Sqdn., Martlesham Heath. 12.1.25. H. G. Cook, D.S.M., and H. J. Brown, to Royal Airship Works, Cardington. 1.12.24.

Pilot Officer W. C. Barnsley to No. 12 Sqdn., Andover, on transfer to Home Estab. 13.1.25.

Accountant Branch

Flying Officer W. E. V. Richards to H.Q., Malta. 12.12.24.

Pilot Officers:—C. E. Aston to R.A.F. Base, Calshot. 23.12.24. H. J. Titherington to No. 5 Flying Training Sch., Sealand. 23.12.24. K. E. M. Holmes to No. 19 Sqdn., Duxford. 23.12.24. J. McL. Murray to No. 24 Sqdn., Kenley. 23.12.24. C. F. Goatcher to No. 17 Sqdn., Hawkinge. 23.12.24. C. Lorimer to Armament and Gunnery Sch., Eastchurch. 23.12.24. E. Smith to No. 1 Sch. of Tech. Training (Boys), Halton. 23.12.24.

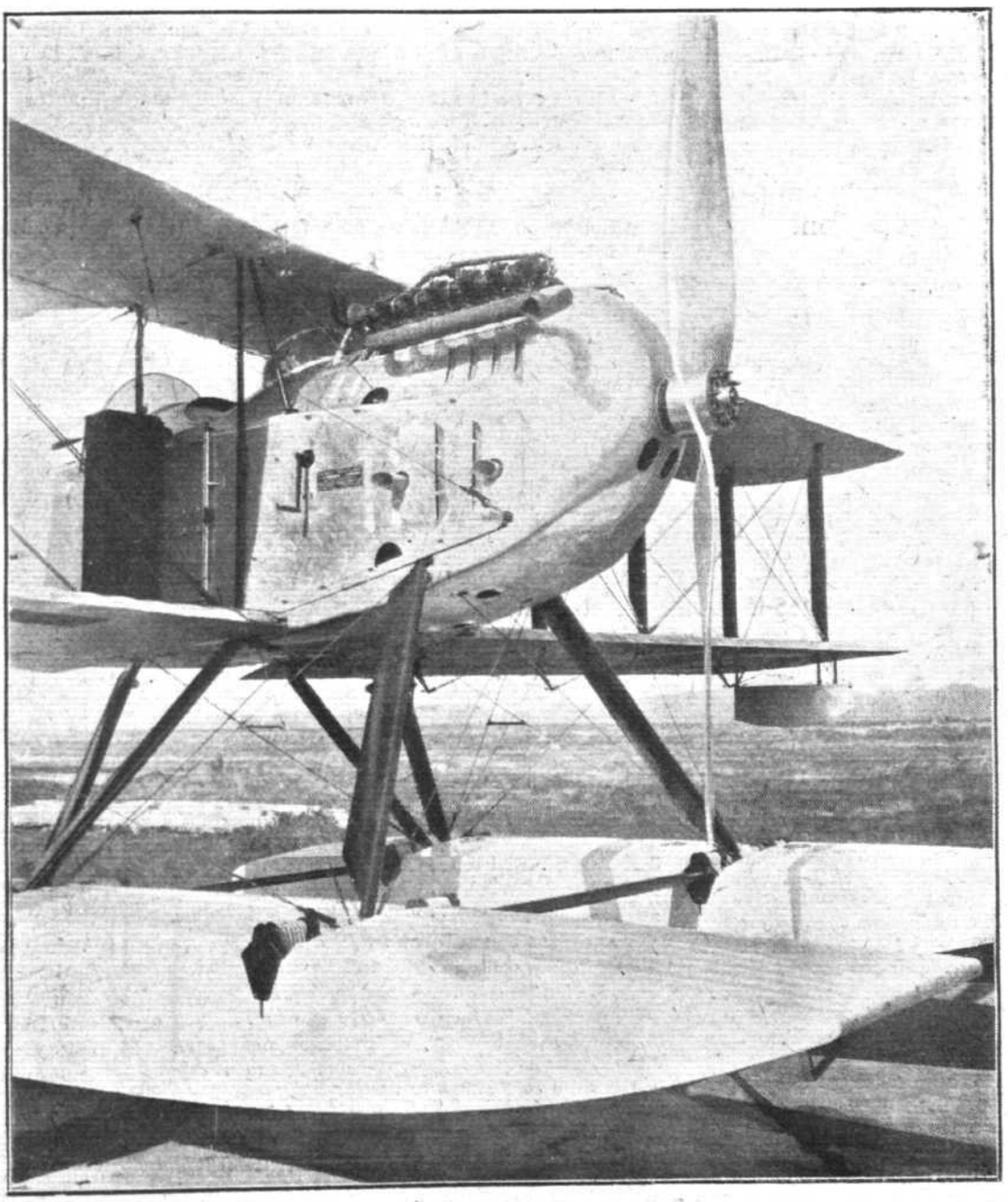
Medical Branch

Wing Commander H. A. Treadgold, M.D., B.A., to Central Medical Board, Hampstead, for duty as Medical Officer. 3.1.25.

Flight Lieutenant (*Dental*) N. H. Medhurst to H.Q., Iraq. 9.12.24.

Royal Air Force (Cadet) College

THE following flight cadets have successfully completed their course of training at the Royal Air Force (Cadet) College. The names are arranged in alphabetical order:—J. R. Addams, N. S. Allinson, The Earl of Bandon, G. R. Beamish (winner of the Sword of Honour); G. B. Beardsworth; J. H. McN. Campbell; A. H. W. J. Cocks (winner of the Abdy Gerrard Fellowes Memorial Prize); G. F. G. Cox; R. J. A. Ford; J. G. Franks; S. H. Hardy; S. H. V. Harris (winner of the R.M. Groves Memorial Prize); G. W. Hayes; M. E. de L. Hayes; A. H. Montgomery; I. M. Scott; P. McK. Terry.



The Fairey III-D Amphibian Seaplane: We show here a "close-up" of this machine—which was described in "Flight" for October 16 last—showing the Rolls-Royce "Eagle IX" engine, Fairey-Reed metal tractor screw, and the float gear. This machine has been sent to British Guiana.

A "Super" Social Evening

ON Friday evening last the staff and employés of the Supermarine Aviation Works, Ltd., of Southampton, attended a "Super" social event—officially described as a conversazione—which from start to finish and in every way was carried through with that same enthusiasm, energy, and enterprise that characterises the more serious work of this firm. It was arranged under the ægis of that active organisation the Supermarine Sports and Social Club, and, although an ambitious first attempt, it met with such success that it is to be an annual event.

This function, which was held at Thornycroft's Institute, Woolston, comprised, amongst other things, two concerts, two dances, a prize distribution, and a whist drive The first dance and concert were held simultaneously—in different halls, of course!—dancing to the Wadi-Halfa Orchestra being in the large hall, while local and London artistes gave an excellent programme in the smaller hall. Half an hour later all interest was centred upon the large hall, where a presentation of sports cups and prizes took place. On the platform were Mr. G. L. Wood (chairman of the directors and president of the Sports and Social Club), Comdr. J. Bird (managing director), Capt. H. Leigh-Mossley and Mr. J. Dickinson (directors).

Comdr. Bird spoke of the splendid progress the club was making, and detailed the activities of the various sections during the past year.

Mr. Wood then presented the challenge cups, medals, and prizes as follow :—

Tennis : Ladies' singles champion and holder of the "Godfrey L. Wood" cup, Miss Penton ; men's singles champion and holder of a similar cup, Mr. H. L. Robinson.

Cricket : Best batting average and holder of the "James Bird" cup, Mr. W. Lucas ; best bowling average and holder of the "Leigh-Mossley" cup, Mr. R. W. Amey.

Rowing : Holders of "McDermott" cup—Messrs. J. Lester (cox), T. Diaper, B. Diaper, R. Drew, and G. Broom. Winners of gig race medals—Messrs. J. Lester (cox), H. Hunt (stroke), W. Besant, B. Eggerton, and N. Jeans.

Then followed a second concert, the most popular feature of which was the "Souse-Up Super-Syncopated Orchestra," under the baton and "beaver" of Mr. F. R. Baldwin.

The second dance and a whist drive commenced about 10 o'clock and continued until 1 a.m., balloons and streamers being very much in evidence.

Rolls-Royce, Ltd.

AT the eighteenth annual meeting of Rolls-Royce, Ltd., at the Midland Hotel, Derby, on January 12, when a dividend of 8 per cent. was declared, the Chairman (Lord Wargrave), presiding, said, during his remarks to the members, that in stock-in-trade and work in progress there was an increase of £222,960. The increase in stock was not caused by over-manufacture. All the cars, aero-engines, and practically all the work in progress, which were taken into account at October 31 last, were, or had since been, ordered, with the sole exception of trial and demonstration cars. That in itself clearly indicated the continued demand for the company's products, both chassis and aero-engines. The trading profit of £163,763 was £7,000 higher than last year, and, including the carry-forward, there was a sum of £173,765 available for disposal.

As regards the appropriation account, the directors recommended a dividend of 8 per cent., which would absorb £65,094, and to dispose of the balance as follows : Income-tax account, £20,000 ; reserve fund, £70,000 ; carry-forward, £18,671. They had set aside in the accounts a sufficient sum to meet all claims for fitting front-wheel brakes to cars of customers who were entitled to them.

He congratulated shareholders on two outstanding performances of their aero-engines during the past year. In a review of long-distance flying of all nations during 1924 it was said : "In spite of the excellence of other flights, one still holds that the finest flight of the year was that of Wing-Comdr. Goble and Flight-Lieut. McIntyre, who flew completely round the coast of Australia on a Fairey seaplane with a Rolls-Royce engine, some 8,500 miles in 90 days. . . . Yet another fine flight was that of Mr. Van der Hoop, of the Dutch Army, who, also on a Fokker with a Rolls-Royce engine with two passengers, started from Amsterdam on October 1, and arrived safely at Batavia, the headquarters of the flying corps in the Dutch East Indies."

In addition to the considerable quantities of 650 h.p. "Condor" and 360 h.p. "Eagle" Rolls-Royce aero-engines which were being used by the British forces, Rolls-Royce aero-engines were also being used by the new great British Imperial Airways Company. In civil flying from this country alone Rolls-Royce aero-engines had already satisfactorily completed over two and a half million flying-machine miles.

Owing to their noted reliability, Rolls-Royce aero-engines had also been selected for use in a number of Dominions and foreign countries, including Canada, South Africa, Australia, New Zealand, British Guiana, Italy, Spain, Portugal, Belgium, Holland, Sweden, Germany, Russia, and Japan.

The company had an excellent staff, trustworthy as they were efficient, both great essentials to a business of that character ; they all worked with great loyalty and devotion under the able managing director, Mr. Claude Johnson. The company had by brain and skill, guided by the genius of Mr. Royce, won a tremendous eminence in the mechanical world, and they were determined to maintain it.

* * * *

PUBLICATIONS RECEIVED

Departemnt of Overseas Trade. Report on the Economic, Financial and Commercial Conditions of the Republic of Panama and the Panama Canal Zone, September, 1924. H.M. Stationery Office, Kingsway, London, W.C. Price 1*s.* net.

Jahbuch fur Luftverkehr 1924. Richard Pflaum Verlag A.G., Herrnstr. 10, Munich. Price 20 Marks.

Per Ardua ad Astra. By 110908. London : Forster Groom and Co., Ltd., 15, Charing Cross, S.W. Price 1*s.* 6*d.*

Report on Civil Aviation, 1923. Dominion of Canada : Department of National Defence. Government Printing Office, Ottawa, Canada. Price 25 cents.

The Air Pilot Monthly Supplement. No. 2. *December* 1924. Air Ministry, Kingsway, W.C.2.

Zur Theorie der Luftschrauben. By Th. Bienen and Th. v. Karman. Aerodynamisches Institut der Technischen Hochschule, Aachen, Germany.

Aeronautical Research Committee Reports and Memoranda : *No.* 920 (*M.*25).—Failure of a Nickel Chrome Steel Under Repeated Stresses of Various Ranges. By Prof. F. C. Lea and H. P. Budgen. June, 1924. Price 4*d.* net. *No.* 921 (Ae. 146).—Effect of Gap Between an Airscrew and a Tractor Body. By C. N. H. Lock and H. Bateman. April, 1924. Price 3*d.* net. H.M. Stationery Office, Kingsway, London, W.C.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations : Cyl. = cylinder ; i.c. = internal combustion ; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1923

Published January 15, 1925

24,475. H. LEITNER. Airscrews. (226,301.)
27,221. V. C. RICHMOND and G. H. SCOTT. Rigid airships. (226,323.)
28,613. A. S. HEINRICH. Radiators and supporting surfaces for aeroplanes. (206,860.)
28,927. H. LEITNER. Screw propellers. (226,346.)

APPLIED FOR IN 1924

Published January 15, 1925

473. G. R. HAMEL. Sustaining device for usual aeroplanes acting without horizontal translation of the flying machine. (226,378.)
2,789. DR. A. VON PARSEVAL. Airships. (226,392.)
11,564. J. J. DAWE. Level indicators for aircraft in flight. (226,429.)

FLIGHT

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